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High Explosive Testing Capabilities at Nevada National Security Site (NNSS)

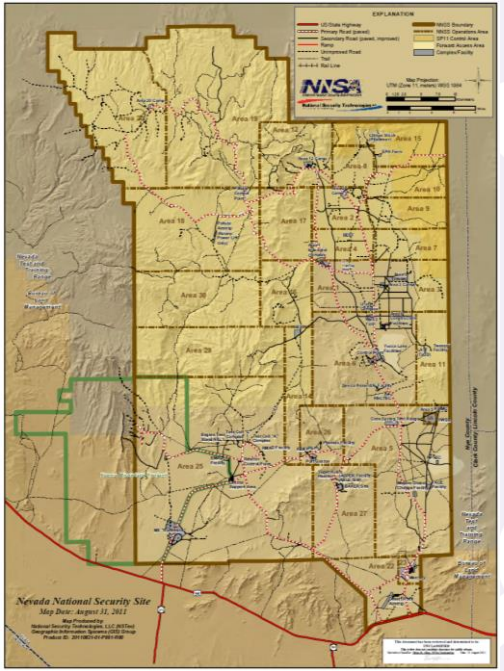
Integrated Weapons Experiments
J-Division Nevada Operations (J-NV)

J-NV Overview

- LANL is managed and operated by Triad National Security, LLC
  - LANL is a non-profit Federally Funded Research & Development Center (FFRDC)
- LANL's Integrated Weapons Experiments (J) Division addresses national security challenges by executing large-scale, integrated, focused experiments, and tests of engineered devices and systems.
- J-NV plans, fields, and executes dynamic high explosive experiments at NNSS. This includes sub-critical experiments involving special nuclear material, as well as small- and large-scale non-nuclear experiments. J-NV generates, analyzes, and disseminates unique, high-quality data.

NNSS Overview

- Nevada National Security Site (NNSS), formerly Nevada Test Site, is a 1,335 square mile Department of Energy outdoor and underground laboratory located 65 miles north of Las Vegas, NV, which supports national defense and global security missions for the National Nuclear Security Administration (NNSA) and other government agencies
- NNSS is managed and operated by Mission Support and Test Services (MSTS)
  - NNSA has approved secondary real estate operations permits to allow LANL to perform work under standard LANL work control at NNSS



Location

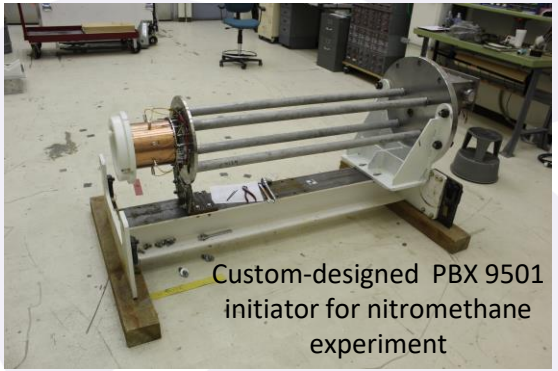
- J-NV operates the Kappa West firing site at NNSS's Big Explosive Experimental Facility (BEEF)
- J-NV has mobile firing and diagnostic systems allowing experiments to be fired anywhere on-site
- Current detonation HE limits at Kappa West:
  - 5,000 lbs (non-fragmenting)
  - 2,500 lbs (fragmenting)
- Other sites at NNSS are available for HE operations
  - Virtually no explosive limit for surface shots
    - Only NNSA approval is required
  - Locations identified for up to 50,000 lbs (non-fragmenting)
  - Locations available for larger fragmenting shots
  - No limit for buried and stemmed shots

100 lbs Composition B/depleted uranium

2200 lbs C4

Assembly/Disassembly Capabilities

- Baker Site
  - Assembly/disassembly bays
  - 15 ton bridge crane
  - Explosive storage magazines
  - Radiological and hazardous materials allowed
  - Classified storage for hazardous and non-hazardous components
    - Up to Secret level including Restricted Data/CNWDI
    - Top Secret (additional approvals required)



Custom-designed PBX 9501 initiator for nitromethane experiment

Fragmentation test article

Experimental Capabilities

- Kappa West
  - 600’ diameter firing point providing plenty of room for any type of test bed layout
- Fragment characterization
  - Including fragment range and blast loading calculations
- Thermal conditioning
- Buried and suspended shots
- Fuel fire scenarios
- Radiological and hazardous materials
- Creative solutions for special applications
- Real estate to establish new capabilities

Fuel Fire experiment

Explosive cables cutters

50 tons nitromethane

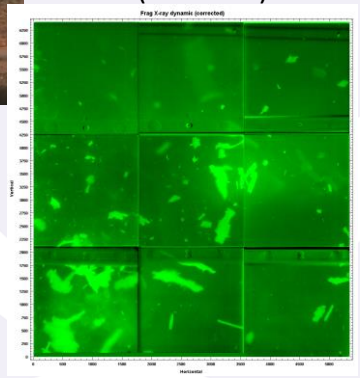
Diagnostic Capabilities

- 68 oscilloscope channels
  - 1 GHz to 23 GHz
  - Room for additional channels
- Flash radiography
  - 150 keV to 1.2 MeV
- High speed video
  - Two Shimadzu (up to 10,000,000 fps)
  - Two Photron (up to 60,000 fps)
- GoPro videos and still photography
- Pressure transducers
- Sound level measurements
- Photon Doppler Velocimetry (PDV)

4000 lbs Composition B

4000 lbs Composition B

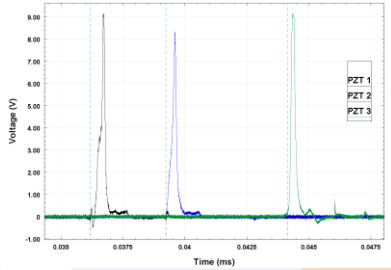
Fragment field radiograph mosaic (42”x 51”)



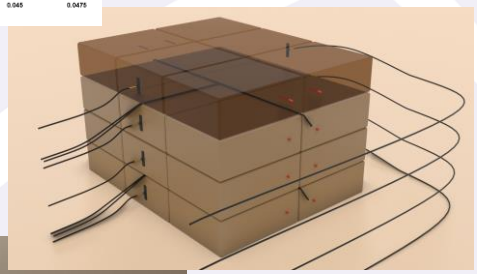
Diagnostic Capabilities

- Time of Arrival (laser, PZT)
- CORRTEX
  - Continuous reflectometry for radius vs time experiments
  - Measures velocity, symmetry, and yield
- Velocity screens
- Programmable Logic Controller (PLC) capability for various control systems
- Renderings of test articles and test bed layouts
  - Available for test planning and reports

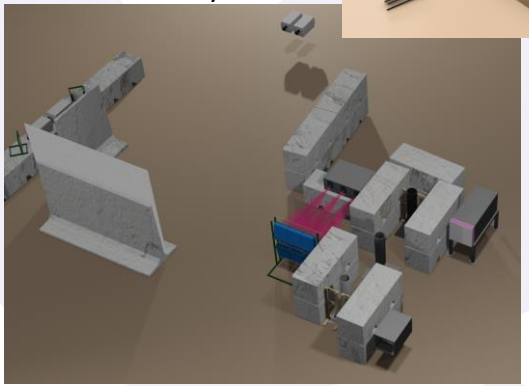
PZT data



Render of 2200 lb C4 test article



Test bed layout



Diagnostic Capabilities

- Space and infrastructure for customers to bring their own diagnostics and hardware
- If J-NV does not posses specialized capabilities or expertise, we have the ability to reach back to colleagues in Los Alamos and from Sandia National Laboratories for assistance
- Examples include:
  - High Resolution Computed Tomography (CT)
  - Digital Image Correlation (DIC)
  - Three-dimensional fragment tracking
  - Unmanned aerial systems (UAS)
    - LIDAR and photogrammetry
  - Seismic monitoring

Previous Collaborations

- Fuel fire experiment
  - Worked with Naval Surface Warfare Center (NSWC) to build propane fuel fire burner that meets NATO thermal flux requirements for fuel fire experiments
- Performed large explosion effects tests for Defense Threat Reduction Agency (DTRA)
- Performed explosives operations for experiments involving:
  - Lawrence Livermore National Laboratory
  - Sandia National Laboratories
  - Pacific Northwest National Laboratory
  - Oak Ridge National Laboratory
  - Savannah River National Laboratory
  - Remote Sensing Laboratory
  - Jet Propulsion Laboratory
  - Desert Research Institute
  - University of Nevada

Contact Information

- Contact J-NV for more information or to discuss potential experiments

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